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CASE REPORT

Placement of dental implants in atrophic jaw with divided crest and ridge expansion technique

Colocación de implantes dentales en maxilar atrófico con técnica de cresta dividida y expansión del reborde

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ABSTRACT

The present case report describes placement of tooth implants in a patient with history of smoking, exhibiting severe, chronic periodontitis and maxillary atrophy with horizontal bone volume deficiency. Simultaneously to implant placement, the technique of divided crest, ridge expansion and bovine bone graft placement was used. After six months, bone integration of all implants was observed and a hybrid, implant-supported prosthesis was manufactured (full bone anchorage). Finally the case was followed for 18 months without observing any complications, and with satisfactory functional and esthetic results for the patient.

RESUMEN

Este reporte de caso describe la colocación de implantes dentales en un paciente con antecedente del hábito de fumar y que presenta periodontitis crónica severa y atrofia maxilar con deficiencia de volumen óseo en sentido horizontal. Simultáneamente a la colocación de implantes se utilizó la técnica de cresta dividida, expansión del reborde y colocación de injerto óseo bovino. Después de seis meses, se observó la oseointegración de todos los implantes y se procedió a la confección de la prótesis implantosoportada de tipo híbrida (anclaje óseo completo). Finalmente, se realizó el seguimiento del caso durante un periodo de 18 meses sin observar complicaciones y con un resultado funcional y estético satisfactorio para el paciente.

Key words: Crest expansion technique, bone ridge expansion, ridge increase.
Palabras clave: Técnica de expansión crestal, expansión de reborde óseo, aumento de reborde.

INTRODUCTION

One of the main criteria to select a patient for candidacy to tooth implant placement is availability of bone volume.[1,2] Literature reports that minimum bone dimension required to place an implant should be 5 mm wide (bucca-palatal/lingual) and between 7 and 10 mm high.[3,4] Nevertheless, in practice, there is a great number of patients requiring dental implants who lack ideal bone circumstances. Among these circumstances, the most frequent is insufficient bone volume, which can be due to the following: alveolar ridge atrophy due to tooth absence, periodontal disease or as sequel of some trauma or condition. These insufficient bone situations are called alveolar ridge deformities; they have been classified according to their morphology.[5] According to this classification, class I consists on bone loss in buccal-lingual direction, this provides more predictable results when applying techniques of horizontal bone volume increase.[6,7] Among these techniques, the following are described: autogenous bone graft trechniques,[8] block bone allografts,[9] and bone ridge expansion techniques.[10] Nevertheless, autogenous block bone graft, up to this date, is the technique most frequently used and is considered the gold standard due to the fact it has shown satisfactory long term results.[11] On the other hand, disadvantages of this technique must also be considered: there can be greater morbidity due to donor zone and waiting time required before implant placement.[12] On the contrary, this article purports to present the technique called divided crest with bone expansion and placement of organic bovine bone graft as an alternative to the rehabilitation in a case of

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maxillary atrophy, performed at the Dental Clinic of the Universidad de Los Hemisferios, Quito, Ecuador.

CASE REPORT

Patient

A 55 year old male patient in apparent good health attended the Dental Clinic of the University Los Hemisferios, Quito Ecuador requesting manufacture of a prosthesis for his upper jaw; the patient additionally informed of tooth mobility and discomfort when speaking or chewing. As relevant history, the patient informed he suffered controlled blood hypertension and habit of smoking over ten cigarettes a day.

Clinical examination

Intraoral examination revealed absence of most teeth in the upper jaw, tooth extrusion, presence of abundant dental plaque and calculi, presence of periodontal pockets larger than 7 mm, dental caries, multiple gingival recessions and evident atrophy of upper alveolar ridge affecting patient's facial aesthetics.

Radiographic examination

Radiographic examination revealed generalized horizontal bone resorption, pneumatization of both maxillary sinuses, caries in tooth 1.3, radio-lucid lesions at the height of periapex of teeth 1.3, 1.4, 2.6 and 4.4 *(Figure 1)*.

Diagnosis

Based on information harvested from clinical and radiographic examinations, the following diagnoses were established: severe generalized chronic periodontitis in tooth 1.3, dental abscesses in teeth 1.3, 1.4, 2.6 and 4.4 as well as upper and lower partial edentulism with upper alveolar ridge atrophy and bilateral maxillary sinuses pneumatization.

Tomographic evaluation

A cone beam computerized tomography was indicated in order to assess remaining bone availability which could allow implant placement. Tomographic evaluation revealed that, in the upper jaw, in spite of generalized bone resorption, there was sufficient bone mass to place a crown-apical implant. Contrarily, in buccal/palatal direction, no sufficient bone mass was found for conventional implant placement *(Figure 2)*. Therefore, this jaw would correspond to Seibert's class III alveolar ridge deformities, thus, the need arose to perform additional surgical procedures to allow placement of at least six implants.

The lower jaw exhibited a bone defect compromising vestibular and lingual aspects of remaining bone at the level of tooth 4.2. Nevertheless, sufficient bone mass was found to place four implants in the inter-foramen area.

Treatment

Considering that the patient was a heavy smoker and the poor periodontal circumstances exhibited by his teeth, the following procedures were undertaken: patient was instructed to quit smoking and to continue with treatment, oral hygiene instruction was provided, roots were scaled and planed, all upper and lower teeth were extracted and provisional prostheses were manufactured. After this, placement of six implants for the upper jaw and four implants for the lower jaw was planned in order to manufacture implant supported prostheses (full bone anchorage) at a later point in treatment.

Surgical procedure

Upper Jaw

Half an hour before commencing surgical procedure, patient was medicated with amoxicillin, 1 g, orally, dexamethasone 4 mg and ketorolac 60 mg intramuscularly. Intraoral asepsis was achieved with 0.12% chlorhexidine, extraoral asepsis was conducted with iodopovidone. Surgery was performed with local anesthesia (lidocaine 2% with epinephrine 1:100,000).

A full thickness incision over the crest was performed, raising a mucoperiosteal flap exposing bone table up to 4 mm from the top of the crest in vestibular direction;

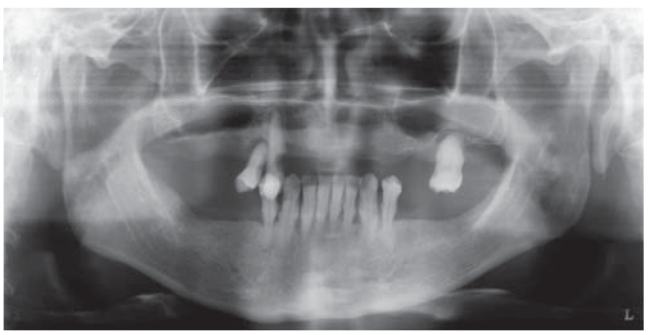

Figure 1. Generalized horizontal bone resorption and bilateral maxillary sinuses pneumatization.